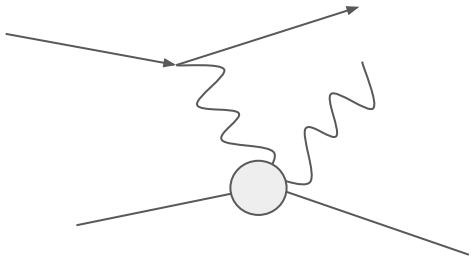
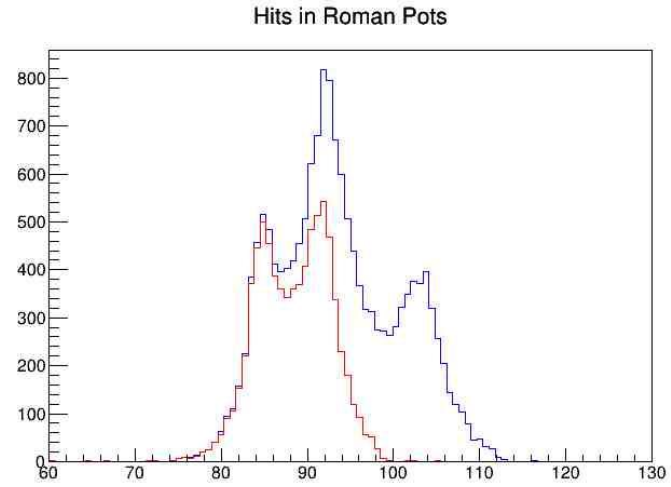
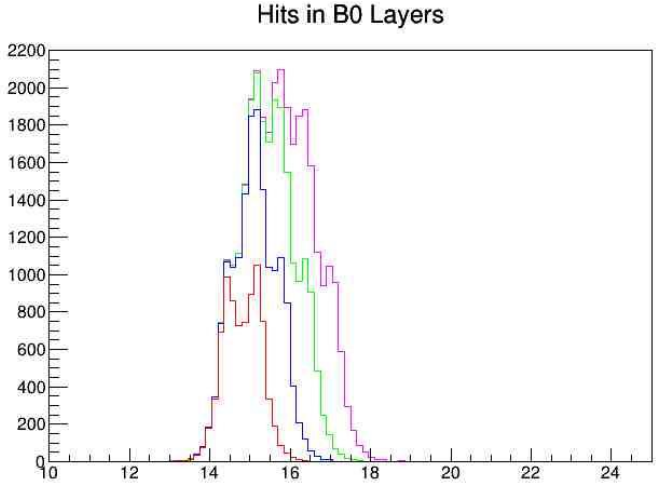
DVCS eA Status

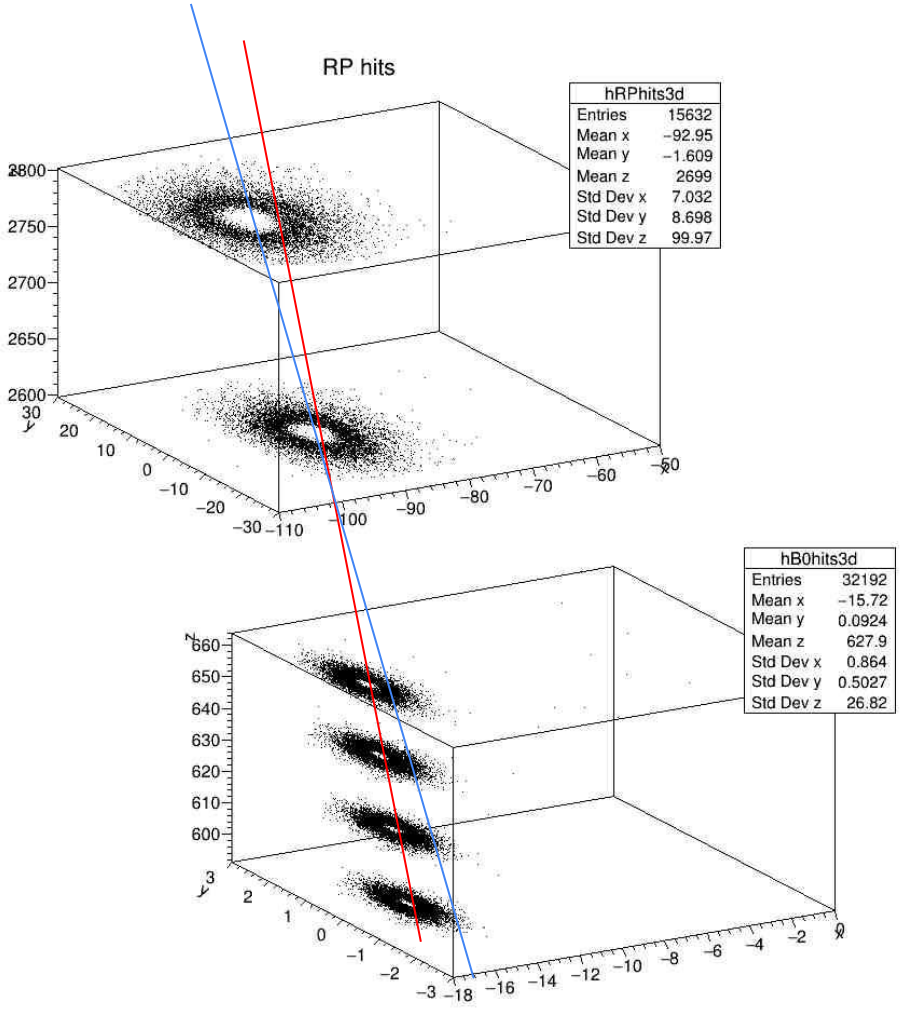
G. Penman, R. Montgomery
01/10/21

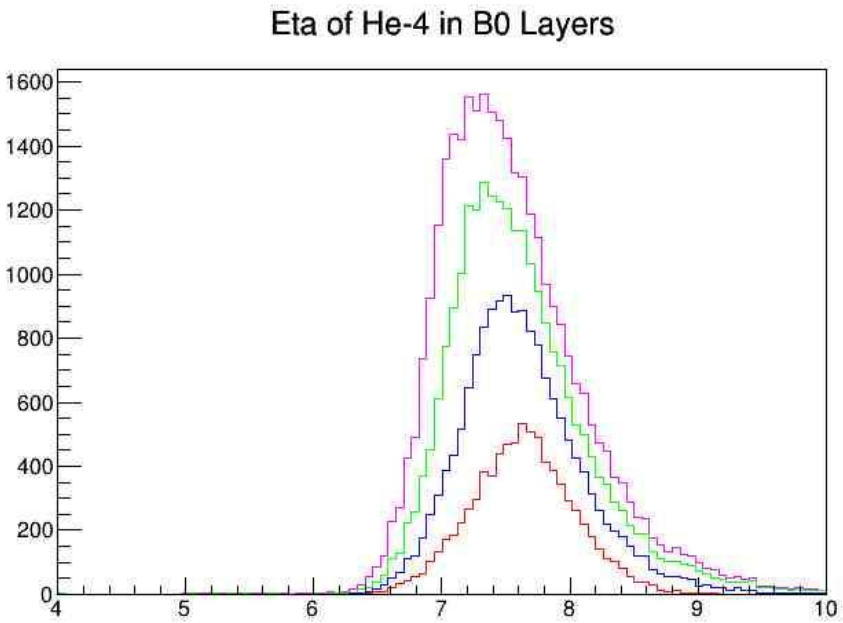
eA->e'A'γ

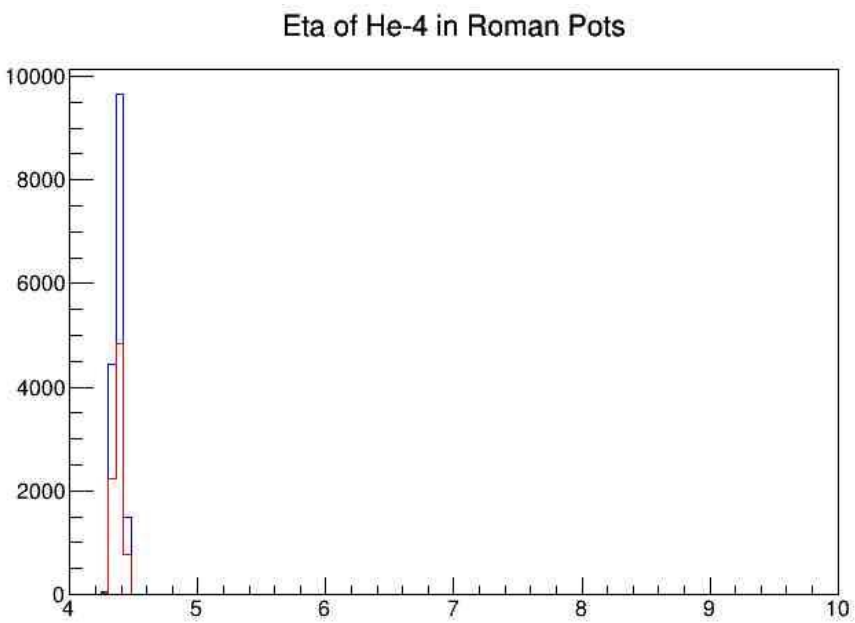



Hits in Roman Pots
800
700
600
500
400
300
200
100
0
60
70
80
90
100
110
120
130


Hits in B0 Layers
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
10
12
14
16
18
20
22
24


RP hits
hRPhits3d
Entries 15632
Mean x −92.95
Mean y −1.609
Mean z 2699
Std Dev x 7.032
Std Dev y 8.698
Std Dev z 99.97
hB0hits3d
Entries 32192
Mean x −15.72
Mean y 0.0924
Mean z 627.9
Std Dev x 0.864
Std Dev y 0.5027
Std Dev z 26.82





10000 Events @ 5x41 (5x164) [Electron Helicity = +1]

Electron Tracks: 9657

Photon Reconstructions (CEMC, EEMC, Total): 1145 + 6903 = 8048

B0 Helium Layer Hits (1-4): 8048,8048, 8048, 8048

RP Hits (1,2): 7861, 7771

Using RP2 hits as exclusivity cut, but with B0_1 momenta values per last week meeting

Final Plots Status

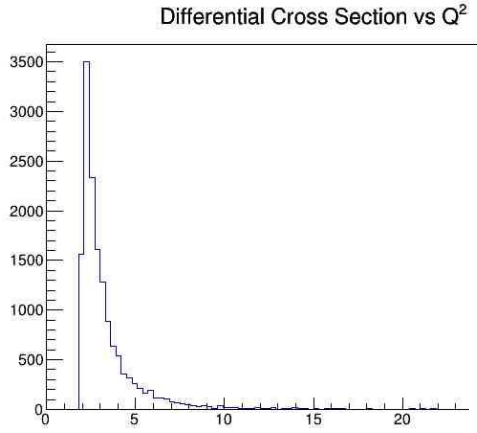
- DVCS Differential cross-section vs Momentum transfer t
- DVCS Differential cross-section vs Momentum transfer Q2
- DVCS Differential cross-section vs Momentum transfer xB
- Detector efficiency as a function of pseudo rapidity (different colors for different particles, vertical axis is %), detector performance and where the particle are detected
- xb versus Q2 filled with relative counts, detector acceptance
- t versus Q2 filled with relative counts, detector acceptance
- xb versus t filled with relative counts, detector acceptance

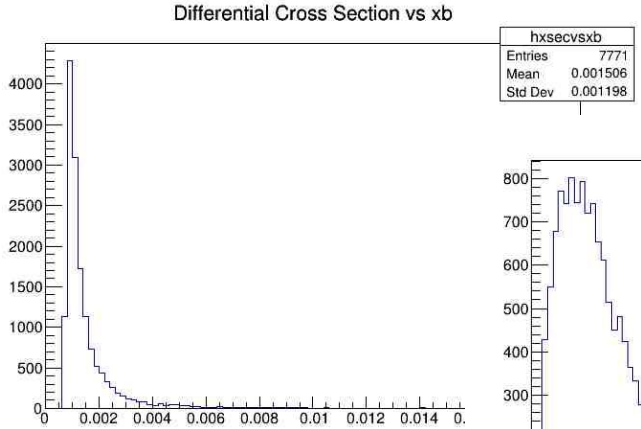
1. DVCS Differential Cross Section vs t, Q^2, x_B

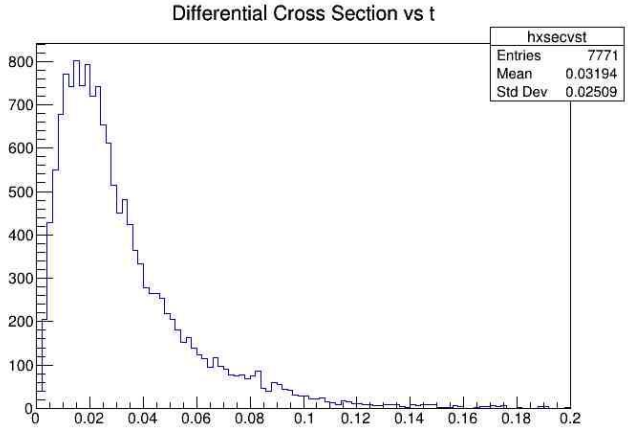
$$\frac{d^4\sigma}{dQ^2 dx_B dt d\phi} - \frac{1}{L\Delta\Omega}(N \pm \sqrt{N})$$

- N is the number of counts in the bin
- L is the integrated luminosity
- $\Delta\Omega$ is the multi-dimensional bin size:

$$\Delta\Omega - \Delta Q^2 \Delta x_B \Delta t \Delta\phi$$







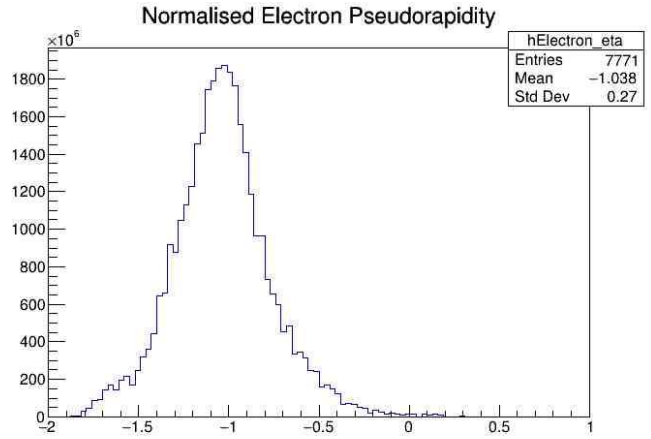
1.7828933 ×10¹⁰ Femtobarn [fb]
5x41 Positive helicity

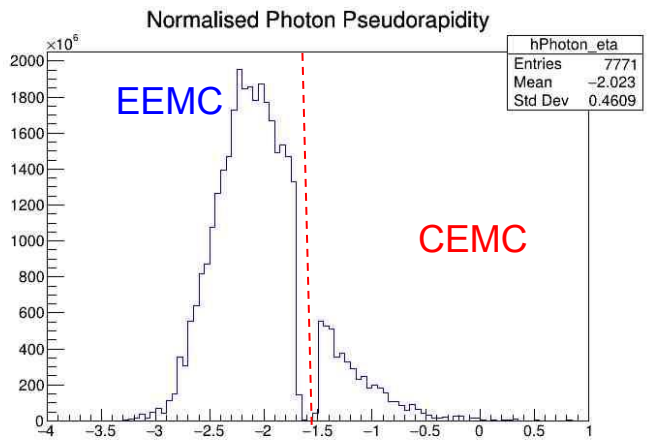
```
Cross section : 17828.933 nb
Precision : 44.246745 nb
Events produced correspond to 0.56088608 nb^-1
```

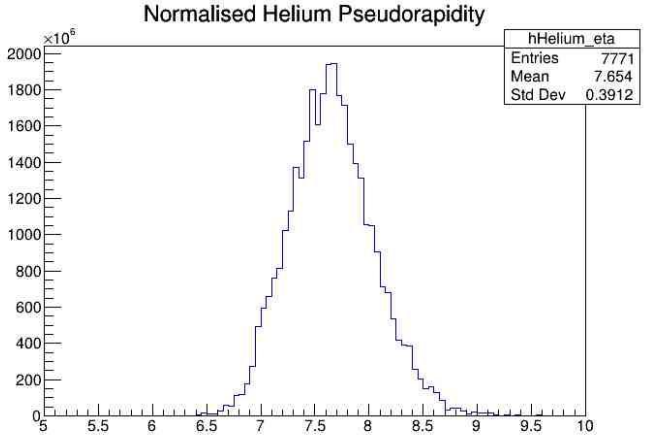
1.79304×10¹⁰ Femtobarn [fb]
5x41 Negative helicity

```
Cross section : 17930.4 nb
Precision : 44.086337 nb
Events produced correspond to 0.55771206 nb^-1
```

2. Pseudorapidity vs Normalised Counts (for each 3 particles, split into where detected - where applicable)







3. Q2, xb, t 2D plots

$$Q^2 = -q^2 = \left(k - k'\right)^2$$

$$= \left(p - p'\right)^2$$

$$x_B = \frac{Q^2}{2M\nu}$$